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Safety Precautions

To avoid body hurt, damage to the device and to your cars, please read the using instruction of PS100 carefully before you use the device.

The common testing process introduced by this instruction is described by the experienced technology service people, many of which require you to take action to avoid possible body hurt, damage to the device or to your car. Please read your car amending instructions and do as it instructs as to ensure safety before or during you test. Please keep attention to the following safety precautions.

- When engine running, it generates CO and other poisonous kinds of air. To avoid severe hurt or damage caused by them, please test in a well-ventilated place.

- Please wear qualified eye-protecting goggle to avoid your eyes from being hurt by the pushed things or harmful fluid.

- When engine running, many parts, for example, coolant fan, pulley and belts of the fan, rotating in high speed. To avoid this kind of hurt, keep caution of these parts. Keep in a safe distance from them and other potentially moving and harmful things.

- When engine running, the parts of the engine become very hot. To avoid being heated and even burned, please avoid touching with the parts.

- Ensure well install the braking before you test the engine or test the car.. Turn to transmission block (automatic transmission) or neutral transmission (manual transmission).Setback car wheels by proper means.

- When the car is ignited, connecting or disconnecting the device to or from the car could destroy the device or car's electronic parts. Therefore, please disconnect the tool from vehicle's DLC socket before connecting PS100 or disconnection the PS100.

- To not to destroy the on-board computer, you'd have to use a one-number multimeter with at least 10meg impedance when taking vehicle electrical measurements.。

- Fuel and battery vapor are highly flammable. To prevent an explosion, keep all sparks, heated items and open flames untouched with the battery, fuel or fuel vapor. Don't smoke near the testing location.

● When working with the engine running, please don't wear loose clothing or any jewelry because loose clothing can be easily caught by the fan, pulley or belts, while jewelry is highly conductive and they can cause burning hurt once they make contacts between the ground and conductive items.

Tool Description

1. Function

PS100 has the following powerful functions:

- Works on all 1996 and newer cars & light trucks that are OBD II compliant (including the VPW, PWM, ISO, KWP 2000 and CAN protocols)
- Reads and clears generic and manufacturer specific Diagnostic Trouble Codes (DTCs)
- Reading Freeze Frame Data
- Testing I/M Reading Status
- Reading vehicle info
- Oxygen sensor test
- Model 6 test
- EVAP System Test

2. Main features

- **Display:** Backlit LCD,160*160 pixel display.

- **Operating Temperature**: 0 to 50℃（﹣32 to 122℉）

- **External Power:** 10.0 to 15.5 vols provided via vehicle battery

- **Dimensions:** 225mm Length 98mm Width   36mm Height

- OBDII connector , 1500mm(59.99")

2. Appearance and Key Descriptions

The appearance of a PS100 is as shown in the above figure.

1. **LCD screen:** 160*160
2. **Enter key:** confirm a selection of a menu list and operate it
3. **Esc key:** retune to the previous screen
4. **Up/down arrow:** move the curse up or down
5. **Left/right arrow:** turn pages
6. **Vehicle diagnostic port:** OBDII -16PIN

Operation Instructions

1. Preparation for Testing

PS100 can test cars and delete error codes while read the error codes. Meanwhile, there are mechanical problems, such as poor engine performance due to lower fuel level, soft cubes damaged, electrical wire or electrical connections, which will also cause faked error codes. Therefore, you need to refer to car service pamphlet for more details before you test the known mechanical problems.

Please check the following items before any test.

- Check the engine, power steering fluid, transmission oil (if applicable), engine coolant fluid and other fluid level. If needed, decrease low fluid levels.
- Ensure air filter is clear and in good condition. Ensure all air filter connectors run properly. Check air filter for holes, rips and cracks.
- Ensure engine belts running well. Check there are not ripped, broken, brittle, loose or lost belts.
- Make sure engine sensor (throttle, gearshift position, transmission, etc.) is safe and mechanically right connected.   Refer to the location of car service manual.
- Make sure engine sensor (throttle, gearshift position, transmission, etc.) is safe and mechanically right connected.   Refer to the location of car service manual.
- Ensure all spark plugs are clean and in good condition. Check if there are damaged, loose, disconnected or lost spark plug wires.
- Ensure battery terminals are clean and tightly connected. Check if there are corroded or damaged connectors. Ensure that the battery and the charging voltages are properly applied.
- Check all electrical wires and harasses are correctly connected. Ensure all insulations are in good condition without bared wires.
- Ensure the engine mechanically sounds. If necessary, perform a compression test, engine vacuum test, timing test (if applicable) and etc.

2. Connect the PS100

2.1 Turn the ignition on.

2.2 Locate the vehicle's 16-pin Data Link Connector (DLC).

2.3 Connect the PS100 cable connector to the vehicle's DLC. Turn on the ignition, The PS100 will auto start, the following screen will be displayed.


- **[Diagnose]**: Diagnose
- **[Language]**: To select language
- **[Contrast]**: contrast value modification
- **[Display Test]**: Lcd test
- **[Keypad Test]**:key test
- **[Information]**:show edition information

3. Diagnose

Choose [**Diagnose**] and then press [Enter] key. The following menu will be displayed on the screen.
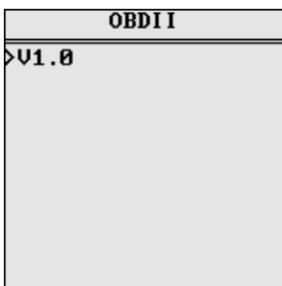
Press ENTER key and it displays.

```
        V2.0                              OBDII

Checking the licen-          Checking ISO9141...
        se...
```
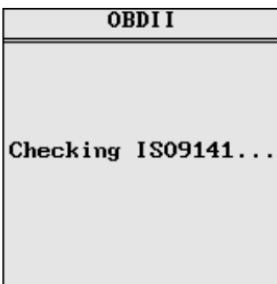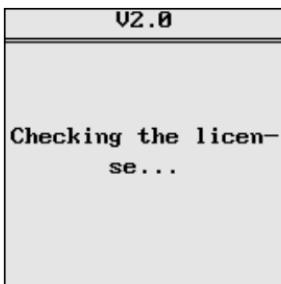
Enter the system and it displays:

```
 Vehicle Diagnosis:
>1)Trouble Codes
 2)Erase Codes
 3)Live Data
 4)Freeze Frame
 5)I/M Status
 6)Vehicle Infor
 7)Oxygen Sensor
 8)Mode 6 Test
```

3-1 Read trouble code

```
 Vehicle Diagnosis:
>1)Trouble Codes
 2)Erase Codes
 3)Live Data
 4)Freeze Frame
 5)I/M Status
 6)Vehicle Infor
 7)Oxygen Sensor
 8)Mode 6 Test
```
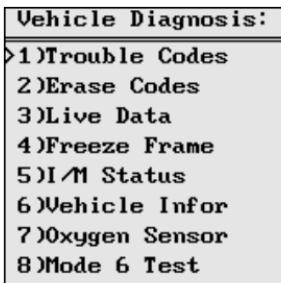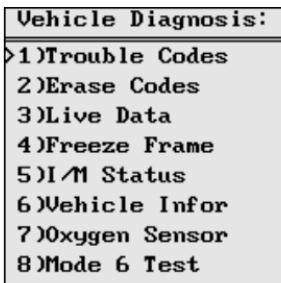
1. the trouble codes function read DTCs from the vehicle's computer modules there tow types of codes, Malfunction Indicator Lamp(MIL) Codes and pending codes

MIL Codes: These codes cause the computer to illuminate the MIL when an emission related or driveability fault occurs. The MIL is also known as the "service Engine Soon" or "Check Engine Lamp". MIL codes remain in

the vehicle's memory until the fault is repaired.

2. Pending Codes: These codes are also referred as "continuous monitor" and "maturing codes". An intermittent fault will cause the computer to store a code in memory. If the fault does not occur within 40 warm-up cycles, the code will be cleared from memory. If the fault occurs a specific number of times, the code will mature into a DTC and the MIL will turn on.

3. Select Trouble codes and press ENTER, The PS100 retrives the DTCs stored in the vehicle's computer modules.

▲   if there are no trouble codes, it will display "No codes in the vehicle!"
▲   If there are any trouble codes, all information will be reported on the display

```
   1)Trouble Codes
>P1847
Transmission Trans-
fer Case Contact P-
late 'A' Open Circ-
uit
P1847
Transmission Trans-
fer Case Contact P-
```

Select one of the error codes if there are over 2 error codes by moving up/down key.

```
   1)Trouble Codes
>P1847
Transmission Trans-
fer Case Contact P-
late 'A' Open Circ-
uit
P1847
Transmission Trans-
fer Case Contact P-
```

If there are factory definition error codes the relative information will be reported on the display，You can select the corresponding car model to make sense of the error codes.

```
   1)Trouble Codes
>GM
 Ford
 Chrysler
 Honda
 Toyota
 Nissan
 VW
 Mazda
```

Take operating GM car error codes for example.

```
   1)Trouble Codes
>P1847
 2-3 Shift Solenoid
 Circuit High Volta-
 ge
 P1847
 2-3 Shift Solenoid
 Circuit High Volta-
 ge
```

3-2 Erase trouble code
Select Erase Codes and press the ENTER key.

```
 Vehicle Diagnosis:
 1)Trouble Codes
>2)Erase Codes
 3)Live Data
 4)Freeze Frame
 5)I/M Status
 6)Vehicle Infor
 7)Oxygen Sensor
 8)Mode 6 Test
```

a message appears asking if you are want to erase all the fault codes.

```
    2)Erase Codes


Do you want to era-
se all the fault c-
     ode(s)?

```

If you Press ENTER

```
    2)Erase Codes



Erase fault code(s)
   successfully!

```
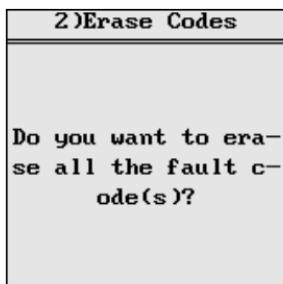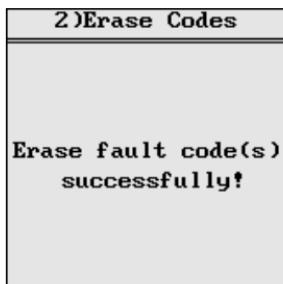
3-3 Live data
1.Display the live data,

```
Vehicle Diagnosis:
 1)Trouble Codes
 2)Erase Codes
>3)Live Data
 4)Freeze Frame
 5)I/M Status
 6)Vehicle Infor
 7)Oxygen Sensor
 8)Mode 6 Test
```
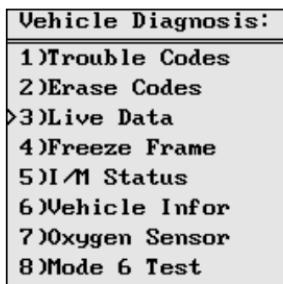
2. Live data are reported on the display

```
        3)Live Data
>Fuel Sys1
                    N/A
 Fuel Sys2
                    N/A
 CALC LOAD
                  0.0%
 COOLANT
              -40DEG C
```

3. Using the LEFT /RIGHT arrows to view Live data of the following page monitors.

```
        3)Live Data
>ST FTRM1
                 -0.0%
 LT FTRM1
               -100.0%
 MAP
              99(KPa)
 ENGINE
                0(RPM)
```

Abbreviated Name for live data specified in Appendix A

3-4 Freeze Frame

1. when an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. this information is referred to as a freeze.
Frame data. this data can be overwriten by faults with a higher priority.
2. if codes were erased, the freeze frame data may not be stored in vehicle memory.
Select Freeze Frame from the menu and press ENTER

```
Vehicle Diagnosis:
1)Trouble Codes
2)Erase Codes
3)Live Data
>4)Freeze Frame
5)I/M Status
6)Vehicle Infor
7)Oxygen Sensor
8)Mode 6 Test
```

3. Freeze Frame data are reported on the display

```
   4)Freeze Frame
>VEH SPEED
                0Km/h
 IAT
           -39(DEG C)
 MAF
          0.00(g/s)
 ABSLT TPS
               99.0%
```

4. Using the LEFT /RIGHT arrows to view Live data of the following page monitors.

```
   4)Freeze Frame
 VEH SPEED
                0Km/h
>IAT
           -39(DEG C)
 MAF
          0.00(g/s)
 ABSLT TPS
               99.0%
```

Abbreviated Name for Freeze Frame specified in Appendix A

3-5 IM Status

1. Select I/M Status and press ENTER

```
    5)I/M Status
>MIL Status
                  OFF
 EVAL:MISFIRE
            SUPPORTED
 EVAL:FUEL SYS
              SUPPOR
 EVAL:COMPONENT
            SUPPORTED
```

2. Using the UP/DOWN arrows to view status of the following monitors.

```
    5)I/M Status
>SUPP:HEATED CAT
        NOT SUPPORTED
 SUPP:EVAP.SYS.
            SUPPORTED
 SUPP:SEC AIR SYS
            SUPPORTED
 SUPP:A/C REFRIG
        NOT SUPPORTED
```

Abbreviated Name	Expanded Name
-Misfire Monitor	Misfire monitor
-FUEL System Mon	Fuel System Monitor
-Com Component	Comprehensive Components Monitor
-Catalyst Mon	Catalyst Monitor
-Htd Catalyst	Heated Catalyst Monitor
-Evap System Mon	Evaporative System Monitor
-Sec Air System	Secondary Air System Monitor
-A/C Refrig Mon	Air Conditioning Refrigerant Monitor
-OXYGEN Sens Mon	Oxygen Sensor Monitor
-Oxygen Sens HTR	Oxygen Heater Sensor Monitor
-EGR System Mon	Exhaust Gas Recirculation System Monitor

3-6 Vehicle info

1. Select "Vehicle info" from the main menu, press the "ENTER" button.

```
Vehicle Diagnosis:
1)Trouble Codes
2)Erase Codes
3)Live Data
4)Freeze Frame
5)I/M Status
>6)Vehicle Infor
7)Oxygen Sensor
8)Mode 6 Test
```
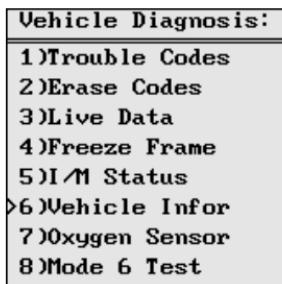
2. Vehicle info are reported on the display.
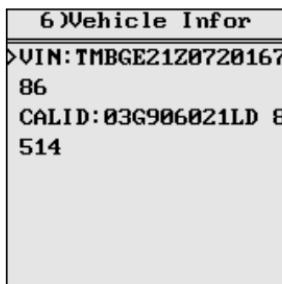
```
 6)Vehicle Infor
>VIN:TMBGE21Z0720167
86
CALID:03G906021LD 8
514
```

3. If the vehicle does not support this mode, a message will show " Not supported!"

```
 6)Vehicle Infor


   Not Support!


```
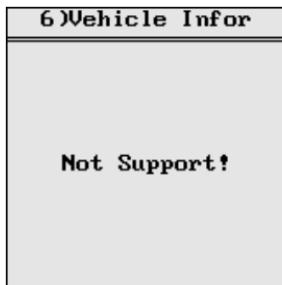
3-7 Oxygen Sensor

1. Select Oxygen Sensor and press ENTER

```
Vehicle Diagnosis:
1)Trouble Codes
2)Erase Codes
3)Live Data
4)Freeze Frame
5)I/M Status
6)Vehicle Infor
>7)Oxygen Sensor
8)Mode 6 Test
```
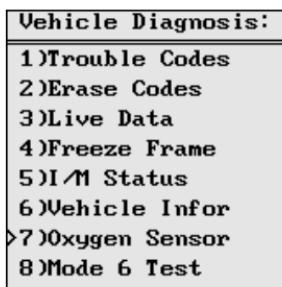
2. If the vehicle supports this mode, data reported on the display. You can select Oxygen sensor location

```
  7)Oxygen Sensor
>Blank1 Sensor1
 Blank1 Sensor2
```

If the vehicle does not support this mode, a message will show " Not supported!"
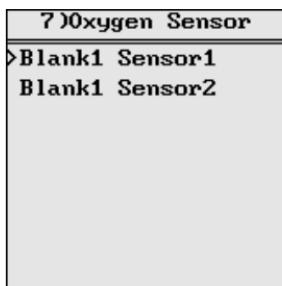
```
  7)Oxygen Sensor


The selected mode −
  is not supported
```
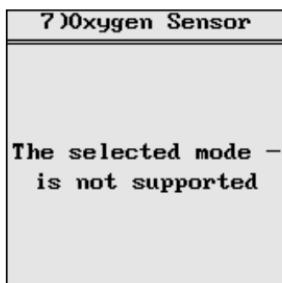
If your vehicle applies to CAN protocol, a message will show.

```
7)Oxygen Sensor


Oxygen sensor test
is not supported f-
or CAN,Please selc-
   et Service $06
```

3. Select Oxygen sensor test id.

```
7)Oxygen Sensor
>Minimum sensor vol-
 tage for test cycl-
 e (calculated)
 Maximum sensor vol-
 tage for test cycl-
 e (calculated)
```
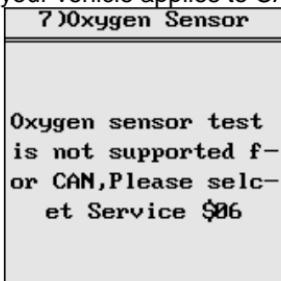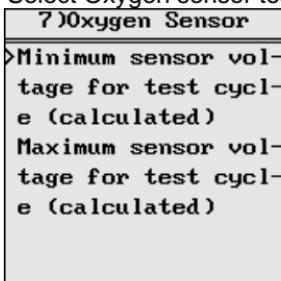
Abbreviated Name	Expanded Name
RichToLeSeThV(Con)	Rich to lean sensor threshold voltage (constant)
LeanToRiSeThV(Con)	Lean to rich sensor threshold voltage (constant)
LowSeVFoSwTiCA(Con)	Low sensor voltage for switch time calculation (constant)
HighSeVoFoSwTiCa(Con)	High sensor voltage for switch time calculation (constant)
RichToLeSwTi(Cal)	Rich to lean sensor switch time (calculated)
LeanToRiSeSwTi(Cal)	Lean to rich sensor switch time (calculated)
MinSeVoForTeCy(Cal)	Minimum sensor voltage for test cycle (calculated)
MaxSeVoForTeCy(Cal)	Maximum sensor voltage for test cycle (calculated)
TimeBeSeTr(Cal)	Time between sensor transitions (calculated)
Sensor period(Cal)	Sensor period (calculated)

4. Disp test result.

```
  7)Oxygen Sensor

Test VAL:0.3v
Min Limit:0.0v
Max Limit:0.0v
```
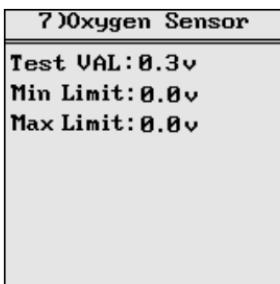
3-8 Model 6 Test

The purpose of this service is to allow access to the results for on-board diagnostic monitoring tests of specific components / systems that are continuously monitored (e.g., mis-firemonitoring) and non-continuously monitored (e.g., catalyst system).

1. Select Model 6 Test and press ENTER

```
Vehicle Diagnosis:
 1)Trouble Codes
 2)Erase Codes
 3)Live Data
 4)Freeze Frame
 5)I/M Status
 6)Vehicle Infor
 7)Oxygen Sensor
>8)Mode 6 Test
```
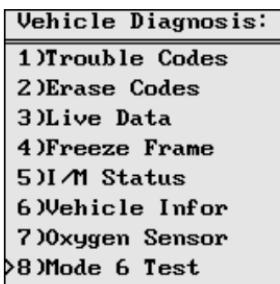
2. If your vehicle applies to ISO 9141-2, PWM,VPW, and ISO 14230-4, information will be reported on the display

```
    8)Mode 6 Test
>TID $01
 TID $02
```
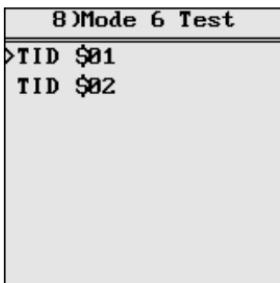
3. Select TID ,then press ENTET

```
        8)Mode 6 Test
>CID $01



```

4. Disp test result.

```
        8)Mode 6 Test
>TID:$01
 CID:$01[Max]
 Value :5
 Max    :64
 Min    :———
 Result:PASS

```
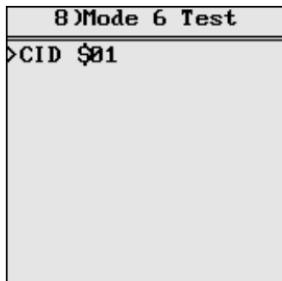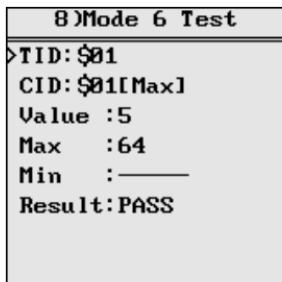
TID   specified in Appendix B
If your vehicle applies to ISO 15765-4, information will be reported on the display

```
        8)Mode 6 Test            8)Mode 6 Test
>OBDMID $01              >TID $8e
 OBDMID $02               TID $91
 OBDMID $21
 OBDMID $a0
 OBDMID $a1
 OBDMID $a2
 OBDMID $a3
 OBDMID $a4
```

```
     8)Mode 6 Test
>OBDMID:$01
 TID:$8e
 Value :0.0000v
 Min   :0.0000v
 Max   :0.0000v
 Result:PASS
```
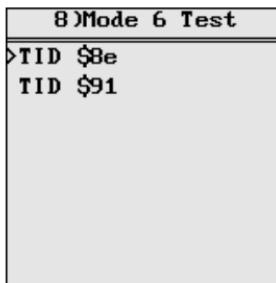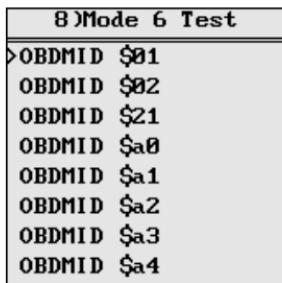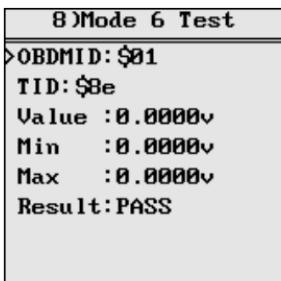
OBDMID and CID specified in Appendix C.

3-9 EVAP System Test
FUNCTIONAL DESCRIPTION—The purpose of this service is to enable
the external test equipment to control the operation of an on-board system,
test or component.
1. Select EVAP System Test and press ENTER

```
 Vehicle Diagnosis:
>9)EVAP System Test
```
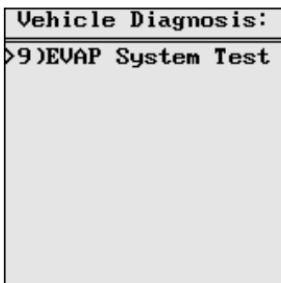
2. There are the following three kinds of test results.
a) If it does not support this function, it will show.

```
9)EVAP System Test




The selected mode —
  is not supported


```
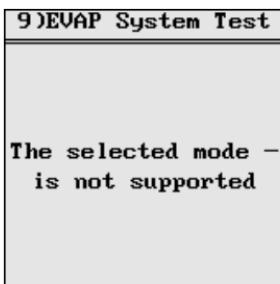
b) If the conditions are not proper to run the test, the vehicle, d"The conditions are not proper to run the test" will display.

c) If test succeeds, it shows "Command Sent"

4. Language

Choose [language] at the main menu. Then press [Enter]. The screen will display as the following

```
        Language
>English
 Geman
 Italian
 Russian
 French
 Portuguese
 Polski
 Greek

```

5. Contrast Adaptation

Choose [Contrast] at the main menu. Then press [Enter]. The screen will display as the following.

```
        Contrast



        73%




```
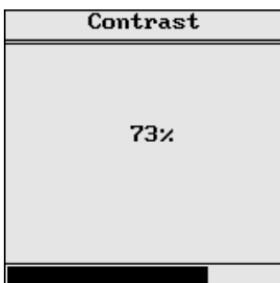
Simply press up/down arrow to set and then press [Enter] to confirm.

6. Lcd test

Choose[Lcd Test] at the main menu, Press Enter],The screen will display
the following dynamic image.

7. Key testing

Choose [Keypad Test] at the main menu. Press [Enter]. The screen will
display the following interface.
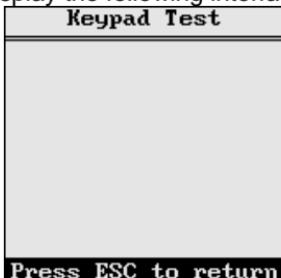
Press any key then the screen will flash due to corresponding to your
cooperation. Double [Esc], you can withdraw from the testing.

8. Information

Choose [About] and then press [Enter]. Then screen will display the version
of this device.

```
        About
>S/N:PS100-88888
 HW:1.0
 SW:1.0
 Date:May 11 2010
 Copyright 2009 Aut-
 ool Corp.
```
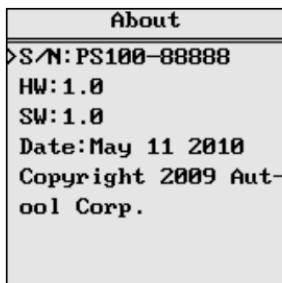
9. Location of DLC

OBD-II 16pin is like the following picture shows. For VW Golf, it usually locates at the right hand direction steering column. For Jetta, it usually locates in the cab on the left bellow the instruction dash; For SANTANA, it locates at the transmission dust cover which is in the front of it.. For more details, please refer to car repairing pamphlet
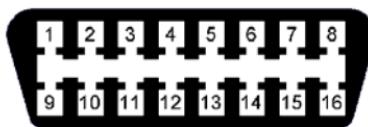
APPENDIX A
Abbreviated NAME FOR SERVICE $01 AND $02 SCALING AND DEFINITION

Abbreviated Name	Expanded Name
Fuel Sys1, Fuel Sys2	Fuel system 1 status, Fuel system 1 status:
CALC LOAD	Calculated LOAD Value
COOLANT	Engine Coolant Temperature
ST FTRM1	Short Term Fuel Trim - Bank 1
LT FTRM1	Long Term Fuel Trim - Bank 1
ST FTRM2	Short Term Fuel Trim - Bank 2
LT FTRM2	Long Term Fuel Trim – Bank 2
FUEL PRES	Fuel Rail Pressure (gauge)
MAP	Intake Manifold Absolute Pressure
ENGINE	Engine RPM
VEH SPEED	Vehicle Speed Sensor
IGN ADV	Ignition Timing Advance for #1 Cylinder
IAT	Intake Air Temperature
MAF	Air Flow Rate from Mass Air Flow Sensor
ABSLT TPS	Absolute Throttle Position
SECOND AIR	Commanded Secondary Air Status

O2S Location	Location of Oxygen Sensors
O2S11	Bank 1 – Sensor 1
O2S12	Bank 1 – Sensor 2
O2S13	Bank 1 – Sensor 3
O2S14	Bank 1 – Sensor 4
O2S21	Bank 2 – Sensor 1
O2S22	Bank 2 – Sensor 2
O2S23	Bank 2 – Sensor 3
O2S24	Bank 2 – Sensor 4
SHRTFT11	Short Term Fuel Trim (Bank 1 – Sensor 1)
SHRTFT12	Short Term Fuel Trim (Bank 1 – Sensor 2)
SHRTFT13	Short Term Fuel Trim (Bank 1 – Sensor 3)
SHRTFT14	Short Term Fuel Trim (Bank 1 – Sensor 4)
SHRTFT11	Short Term Fuel Trim (Bank 2 – Sensor 1)
SHRTFT12	Short Term Fuel Trim (Bank 2 – Sensor 2)
SHRTFT13	Short Term Fuel Trim (Bank 2 – Sensor 3)
SHRTFT14	Short Term Fuel Trim (Bank 2 – Sensor 4)
OBD2 STAT	OBD requirements to which vehicle is designed
PTO STATUS	Power Take Off (PTO) Status
MI Dist. Traveled	Distance Travelled While MIL is Activated

O2S W.R.	EQ_RAT11	Bank 1 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S1	Bank 1 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT12	Bank 1 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S2	Bank 1 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT13	Bank 1 – Sensor 3 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S3	Bank 1 – Sensor 3 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT14	Bank 1 – Sensor 4 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S4	Bank 1 – Sensor 4 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT21	Bank 2 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S1	Bank 2 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT22	Bank 2 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S2	Bank 2 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT23	Bank 2 – Sensor 3 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S3	Bank 2 – Sensor 3 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT24	Bank 2 – Sensor 4 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S4	Bank 2 – Sensor 4 (wide range O2S) Oxygen Sensor Voltage
//24-2b 0x1d		
O2S W.R.	EQ_RAT11	Bank 1 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S1	Bank 1 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT12	Bank 1 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S2	Bank 1 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R	EQ_RAT13	Bank 2 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)

O2S W.R.	B1,S3	Bank 2 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT14	Bank 2 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S4	Bank 2 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT21	Bank 3 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S1	Bank 3 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT22	Bank 3 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S2	Bank 3 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT23	Bank 4 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S3	Bank 4 – Sensor 1 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT24	Bank 4 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S4	Bank 4 – Sensor 2 (wide range O2S) Oxygen Sensor Voltage
O2S W.R.	EQ_RAT11	Bank 1 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S1	Bank 1 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT12	Bank 1 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S2	Bank 1 – Sensor 2 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT13	Bank 1 – Sensor 3 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S3	Bank 1 – Sensor 3 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT14	Bank 1 – Sensor 4 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S4	Bank 1 – Sensor 4 (wide range O2S) Oxygen Sensor Current
O2S W.R	EQ_RAT21	Bank 2 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R	B2,S1	Bank 2 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT22	Bank 2 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S2	Bank 2 – Sensor 2 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT23	Bank 2 – Sensor 3 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S3	Bank 2 – Sensor 3 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT24	Bank 2 – Sensor 4 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S4	Bank 2 – Sensor 4 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT11	Bank 1 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S1	Bank 1 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT12	Bank 1 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B1,S2	Bank 1 – Sensor 2 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT21	Bank 2 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S1	Bank 2 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT22	Bank 2 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B2,S2	Bank 2 – Sensor 2 (wide range O2S) Oxygen Sensor Current
O2S W.R	EQ_RAT31	Bank 3 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R	B3,S1	Bank 3 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT32	Bank 3 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B3,S2	Bank 3 – Sensor 2 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT41	Bank 4 – Sensor 1 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B4,S1	Bank 4 – Sensor 1 (wide range O2S) Oxygen Sensor Current
O2S W.R.	EQ_RAT42	Bank 4 – Sensor 2 (wide range O2S) Equivalence Ratio (lambda)
O2S W.R.	B4,S2	Bank 4 – Sensor 2 (wide range O2S) Oxygen Sensor Current

APPENDIX B

This applies to ISO 9141-2, SAE J1850, and ISO 14230-4
definition for service $06.

TID(TEST ID SCALING DESCRIPTION)
$01 Rich to lean sensor threshold voltage (constant)
$02 Lean to rich sensor threshold voltage (constant)
$03 Low sensor voltage for switch time calculation (constant)
$04 High sensor voltage for switch time calculation (constant)
$05 Rich to lean sensor switch time (calculated)
$06 Lean to rich sensor switch time (calculated)
$07 Minimum sensor voltage for test cycle (calculated)
$08 Maximum sensor voltage for test cycle (calculated)
$09 Time between sensor transitions (calculated)
$0A Sensor period (calculated)
$0B-$1F reserved - to be specified by SAE and/or ISO
$21-$2F manufacturer Test ID description
$30-$3F manufacturer Test ID description
$41-$4F manufacturer Test ID description
$50-$5F manufacturer Test ID description
$61-$6F manufacturer Test ID description
$70-$7F manufacturer Test ID description
$81-$9F manufacturer Test ID description
$A1-$BF manufacturer Test ID description
$C1-$DF manufacturer Test ID description
$E1-$FF manufacturer Test ID description

APPENDIX C

This only applies to ISO 15765-4 definition for service $06
OBDMID (ON-BOARD DIAGNOSTIC MONITOR ID)
DEFINITION FOR SERVICE $06

OBDMID (Hex) On-Board Diagnostic Monitor ID name

00 OBD Monitor IDs supported ($01 - $20)
01 Oxygen Sensor Monitor Bank 1 - Sensor 1
02 Oxygen Sensor Monitor Bank 1 - Sensor 2
03 Oxygen Sensor Monitor Bank 1 - Sensor 3
04 Oxygen Sensor Monitor Bank 1 - Sensor 4
05 Oxygen Sensor Monitor Bank 2 - Sensor 1
06 Oxygen Sensor Monitor Bank 2 - Sensor 2
07 Oxygen Sensor Monitor Bank 2 - Sensor 3

08 Oxygen Sensor Monitor Bank 2 - Sensor 4
09 Oxygen Sensor Monitor Bank 3 - Sensor 1
0A Oxygen Sensor Monitor Bank 3 - Sensor 2
0B Oxygen Sensor Monitor Bank 3 - Sensor 3
0C Oxygen Sensor Monitor Bank 3 - Sensor 4
0D Oxygen Sensor Monitor Bank 4 - Sensor 1
0E Oxygen Sensor Monitor Bank 4 - Sensor 2
0F Oxygen Sensor Monitor Bank 4 - Sensor 3
10 Oxygen Sensor Monitor Bank 4 - Sensor 4
11 - 1F Reserved by document for future standardization
20 OBD Monitor IDs supported ($21 - $40)
21 Catalyst Monitor Bank 1
22 Catalyst Monitor Bank 2
23 Catalyst Monitor Bank 3
24 Catalyst Monitor Bank 4
25 – 30 Reserved by document for future standardization
31 EGR Monitor Bank 1
32 EGR Monitor Bank 2
33 EGR Monitor Bank 3
34 EGR Monitor Bank 4
35 - 38 Reserved by document for future standardization
39 EVAP Monitor (Cap Off)
3A EVAP Monitor (0.090")
3B EVAP Monitor (0.040")
3C EVAP Monitor (0.020")
3D Purge Flow Monitor
3E - 3F Reserved by document for future standardization
40 OBD Monitor IDs supported ($41 - $60)
41 Oxygen Sensor Heater Monitor Bank 1 - Sensor 1
42 Oxygen Sensor Heater Monitor Bank 1 - Sensor 2
43 Oxygen Sensor Heater Monitor Bank 1 - Sensor 3
44 Oxygen Sensor Heater Monitor Bank 1 - Sensor 4
45 Oxygen Sensor Heater Monitor Bank 2 - Sensor 1
46 Oxygen Sensor Heater Monitor Bank 2 - Sensor 2
47 Oxygen Sensor Heater Monitor Bank 2 - Sensor 3
48 Oxygen Sensor Heater Monitor Bank 2 - Sensor 4
49 Oxygen Sensor Heater Monitor Bank 3 - Sensor 1
4A Oxygen Sensor Heater Monitor Bank 3 - Sensor 2
4B Oxygen Sensor Heater Monitor Bank 3 - Sensor 3
4C Oxygen Sensor Heater Monitor Bank 3 - Sensor 4
4D Oxygen Sensor Heater Monitor Bank 4 - Sensor 1
4E Oxygen Sensor Heater Monitor Bank 4 - Sensor 2
4F Oxygen Sensor Heater Monitor Bank 4 - Sensor 3
50 Oxygen Sensor Heater Monitor Bank 4 - Sensor 4

51 - 5F Reserved by document for future standardization
60 OBD Monitor IDs supported ($61 - $80)
61 Heated Catalyst Monitor Bank 1
62 Heated Catalyst Monitor Bank 2
63 Heated Catalyst Monitor Bank 3
64 Heated Catalyst Monitor Bank 4
65 - 70 Reserved by document for future standardization
71 Secondary Air Monitor 1
72 Secondary Air Monitor 2
73 Secondary Air Monitor 3
74 Secondary Air Monitor 4
75 - 7F Reserved by document for future standardization
80 OBD Monitor IDs supported ($81 - $A0)
81 Fuel System Monitor Bank 1
82 Fuel System Monitor Bank 2
83 Fuel System Monitor Bank 3
84 Fuel System Monitor Bank 4
85 - 9F Reserved by document for future standardization
A0 OBD Monitor IDs supported ($A1 - $C0)
A1 Mis-Fire Monitor General Data
A2 Mis-Fire Cylinder 1 Data
A3 Mis-Fire Cylinder 2 Data
A4 Mis-Fire Cylinder 3 Data
A5 Mis-Fire Cylinder 4 Data
A6 Mis-Fire Cylinder 5 Data
A7 Mis-Fire Cylinder 6 Data
A8 Mis-Fire Cylinder 7 Data
A9 Mis-Fire Cylinder 8 Data
AA Mis-Fire Cylinder 9 Data
AB Mis-Fire Cylinder 10 Data
AC Mis-Fire Cylinder 11 Data
AD Mis-Fire Cylinder 12 Data
AE - BF Reserved by document for future standardisation
C0 OBD Monitor IDs supported ($C1 - $E0)
C1 - DF Reserved by document for future standardisation
E0 OBD Monitor IDs supported ($E1 - $FF)
E1 - FF Vehicle Manufacturer defined OBDM IDs

TID(STANDARDIZED TEST ID DESCRIPTION)
Range (Hex) Description

00 Reserved by document

01 Rich to lean sensor threshold voltage (constant)

02 Lean to rich sensor threshold voltage (constant)

03 Low sensor voltage for switch time calculation (constant)

04 High sensor voltage for switch time calculation (constant)

05 Rich to lean sensor switch time (calculated)

06 Lean to rich sensor switch time (calculated)

07 Minimum sensor voltage for test cycle (calculated)

08 Maximum sensor voltage for test cycle (calculated)

09 Time between sensor transitions (calculated)

0A Sensor period (calculated)

0B EWMA(Exponential Weighted Moving Average)misfire counts for last 10 driving cycles (calculated)

 Calculation: 0.1 * (current counts) + 0.9 * (previous average)

 Initial value for (previous average) = 0

0C Misfire counts for last/current driving cycles (calculated)

0D - 7F Reserved for future standardisation